

Preparing PM2.5 Emission Inventories



Ammonia

Section 3

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Ammonia - Key Sources & Issues



■ **Key Categories in Current EI**

- Animal Husbandry (80%)
- Fertilizer Application (10%)
- Point Sources (may be large locally), Mobile Sources

■ **Missing Sources** (May not all be major sources)

- Humans, Domestic and wild animals
- Open burning

■ **Soils and Vegetation**

- Can be source or sink -- Work ongoing in TX and CA

■ **Ammonia is Important to AQ Analyses**

- Involved in formation of Sulfate, Nitrate
- SO₂, NO_x may be subject to regulation

Animal Husbandry



■ Higher Priorities:

■ Focus on these Animal Types

- | Beef Cattle, Dairy Cattle, Hogs, Poultry
- | Animal Size (Weight or size class)

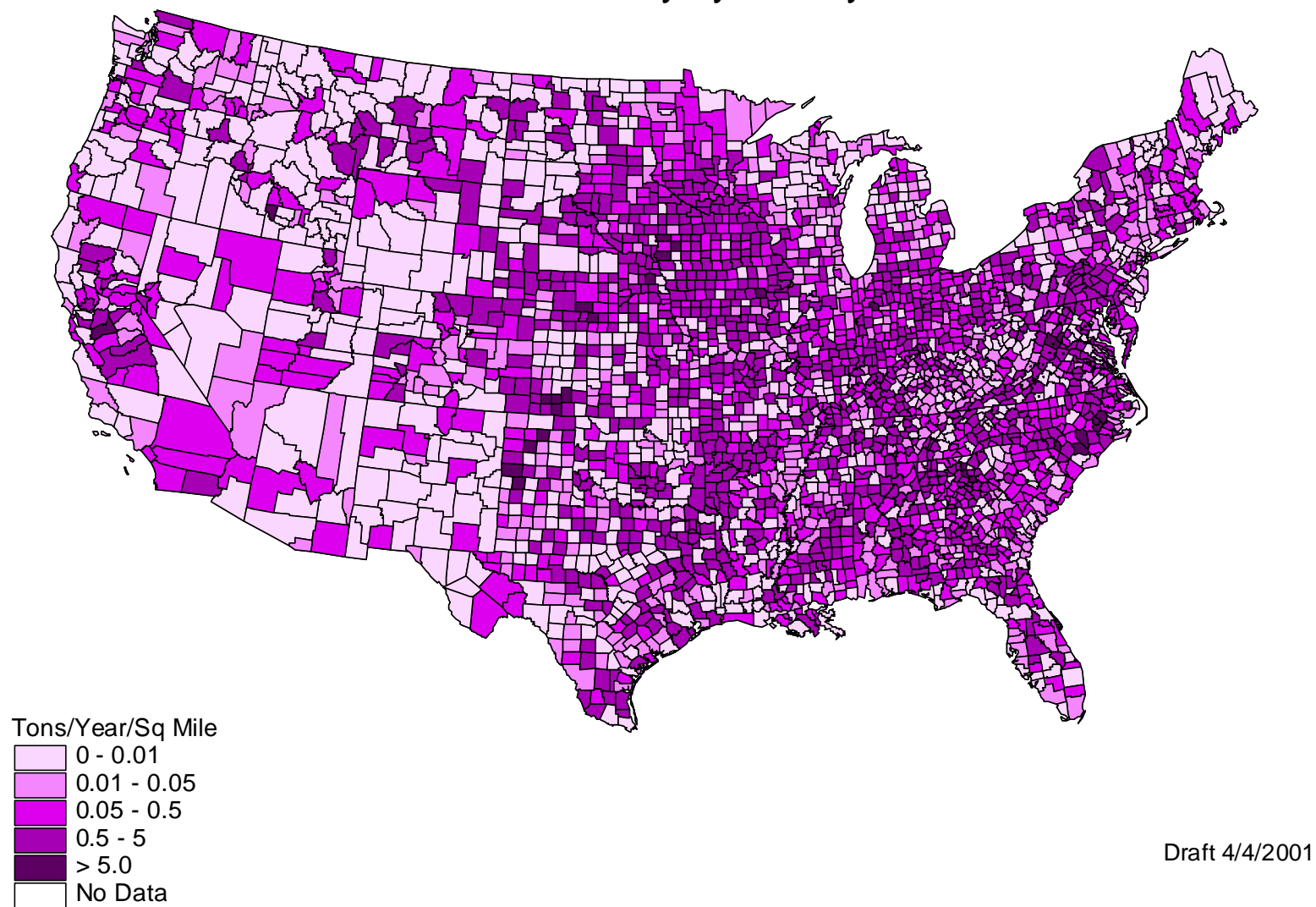
■ Location

- | Large Facilities
- | Facilities in large counties

■ Waste Application & Treatment

- | When, how & how much added to soil
- | Type of storage & waste system

Animal Husbandry - 2805020000, 2805025000, 2805030000, 2805035002
NH3 Emission Density by County - 1999



Ammonia From Point Sources

(fertilizer production, refineries, POTW's, refrigeration)



- **Point sources** - Significant local contributors?
- **NEI estimates** - Largely based upon 1985 NAPAP inventory projected to present using economic growth data at state/SIC level. Small amount of 1996 point source data now in NEI.
- **Inconsistencies** - Emission sources with same SCC may not be estimated consistently (State to State)
- **Priority Project:** Check NEI for local sources, look for gaps and logical inconsistencies, then target large emitters.

Ammonia from Fertilizer Application



- **NEI estimates based upon:**

- European factors (Battye Report)
- Activity data used is sales by month and county from Commercial Fertilizer Database compiled by Association of American Plant Food Control Officials & The Fertilizer Institute for 10 fertilizer types.

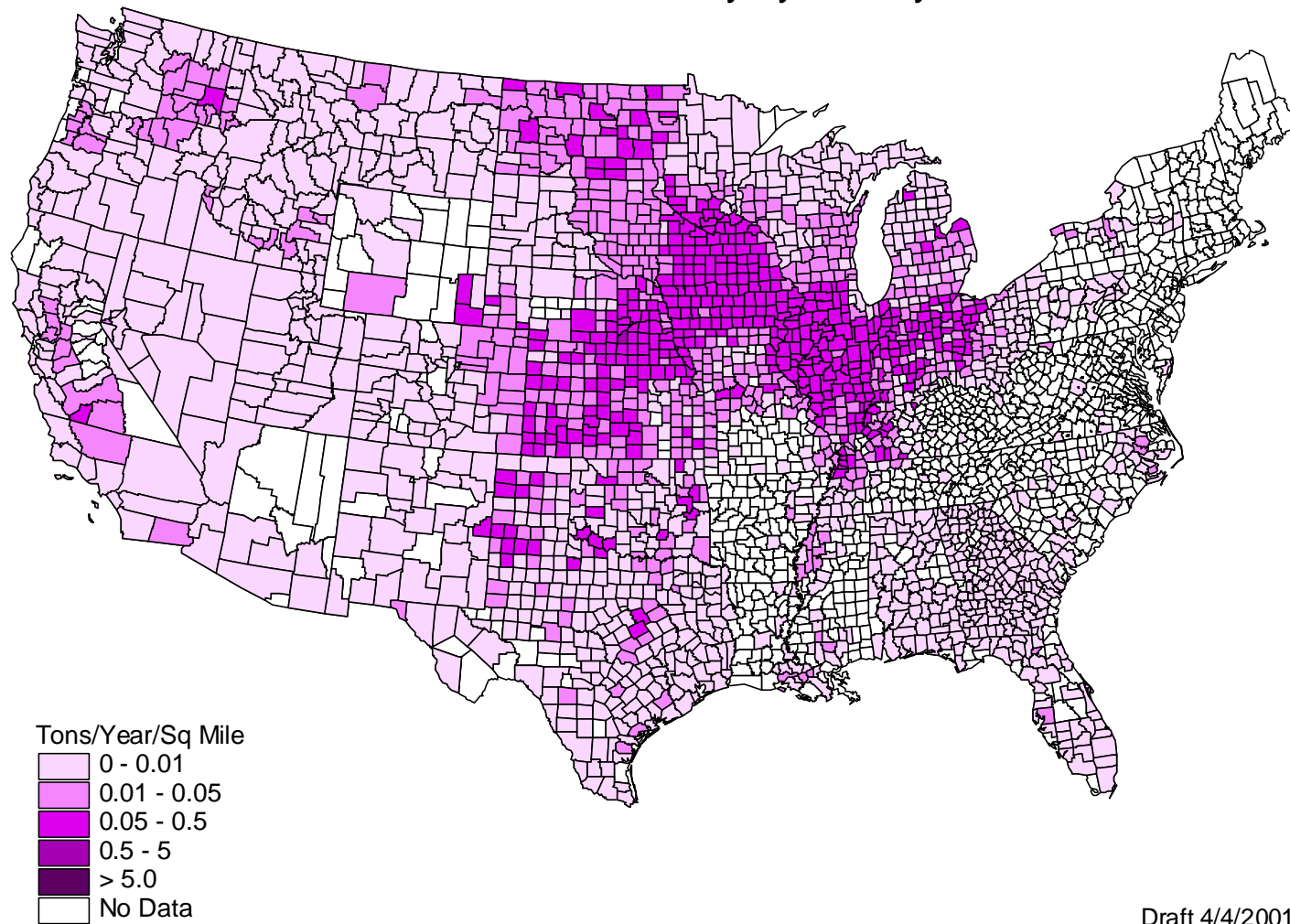
- **Local information is needed:**

- Link to Crop Calendar (when, where)
- Fertilizer Type
- Method of Application (injection Vs. broadcast)

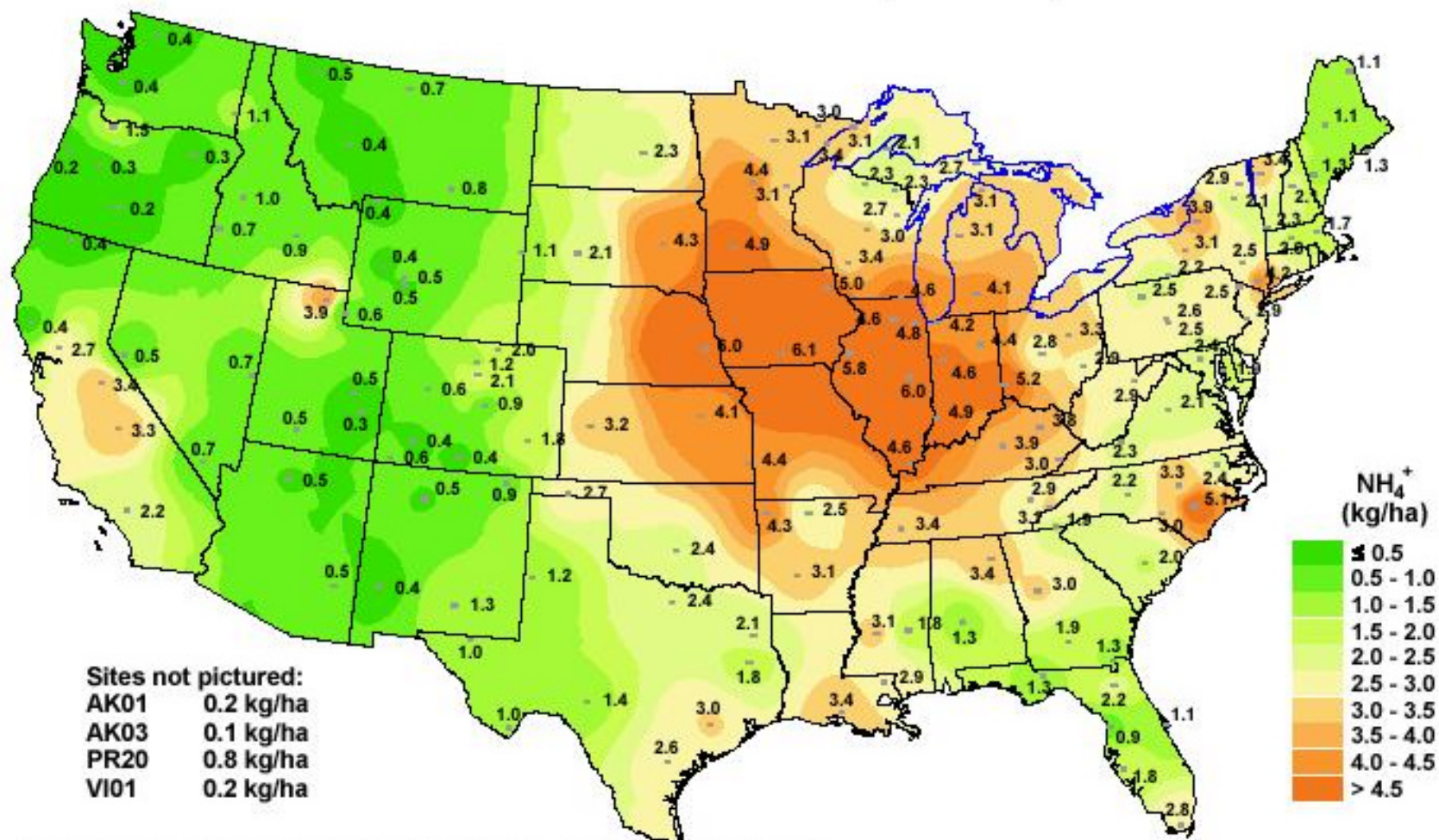
- **Missing from EI:** Organic fertilizer (animal waste)

- **Recent work by CMU:** Contains improved spatial & temporal resolution, uses same sales reference.

Fertilizer Application 2801700001
NH₃ Emission Density by County - 1999

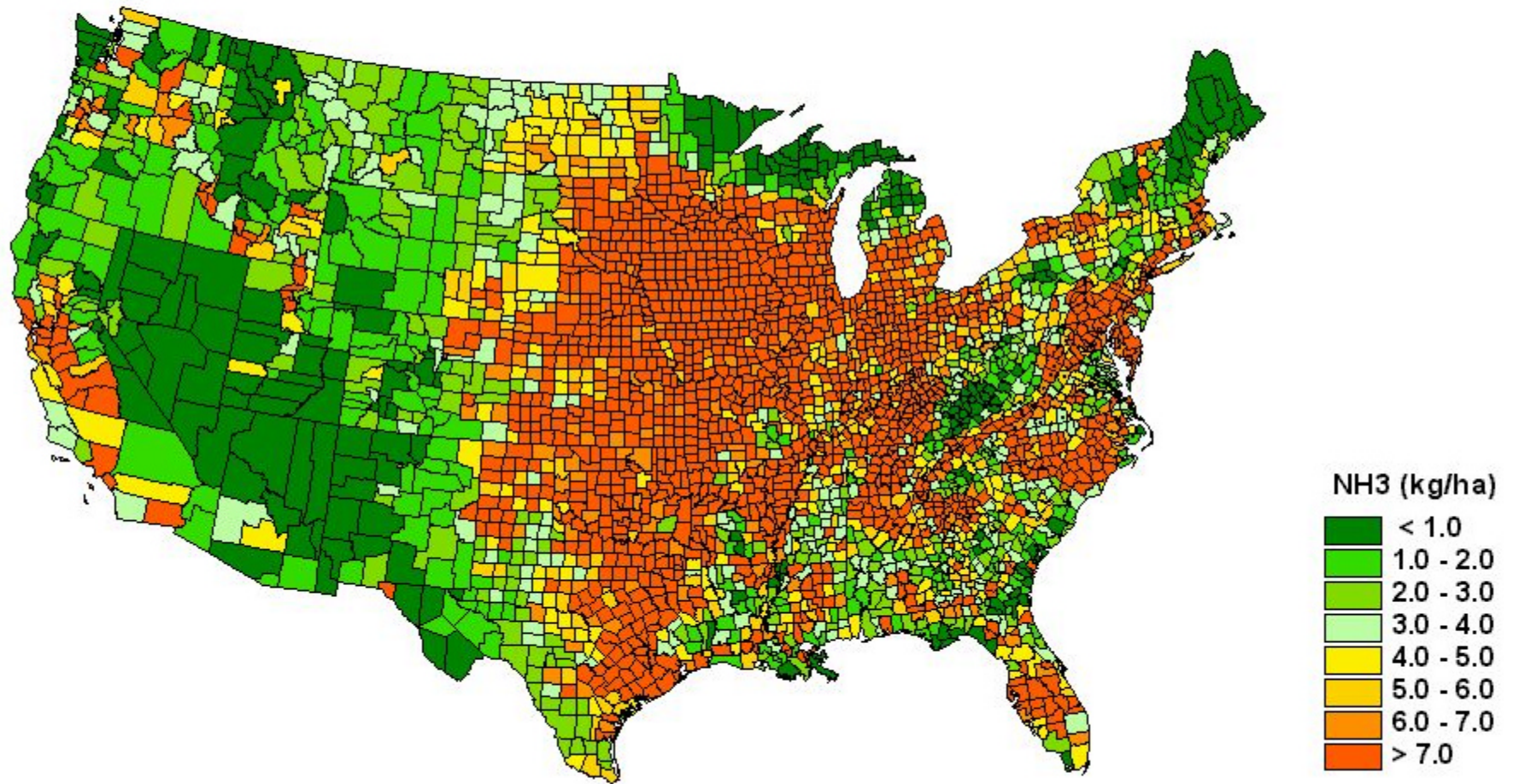


Estimated ammonium ion deposition, 1998



National Atmospheric Deposition Program/National Trends Network
<http://nadp.sws.uiuc.edu>

Estimated Ammonia Emissions-NET Inventory



Temporal & Spatial Resolution Needed in NH3 EI for Regional Scale Analyses

■ Spatial Resolution

- **County level** (unless very large county)
- **NOT** "Farm" or "Process" Level.
- CMU emissions model has capability for sub-county allocation if needed for larger counties.

■ Temporal Resolution

- Changes in animal populations thru the year.
- Fertilizer application patterns (crop calendar)
- Temporal variation in waste disposal practices

■ Recent work by CMU:

- Improved spatial & temporal resolution, using same sales reference.
- How Comparison to NEI ?
- Lacks SCCs

Ongoing & Upcoming NH3 Emissions Inventory-Related Activities

■ Interim Improvements to EI Methods -- On What Basis ?

- Battye Report to CRC
- ORD (NRMRL) - Report for State of NC
- ORD (NERL) - Inverse modeling studies
- Known "missing" source categories

■ How can S/L/T's Work to Improve Temporal Resolution

- Local Refinements to Crop Calendar
- Animal population shifts during year
- Timing of waste disposal

■ What Research is Needed ? "Process-level" understanding...

- Temperature, Moisture, Waste-handling & Operational practices

■ What's Happening at the National Level (EI-related) ?

- Ag AQ Task Force ... Survey on EF needs?
- NAS review of ERG report for EPA on NH3 Emission Estimation